

Listing of Claims

This listing of claims replaces all prior claims of the captioned patent application.

Claim 1. (currently amended) A platen for use in a chemical mechanical planarization (CMP) system, comprising:

a structure configured with at least two apertures, one or more of the at least two apertures one aperture for defining at least one localized fluid-pressure platen zone, one or more of the at least two apertures defining at least one fluid-bearing platen zone configured to allow a flow of fluid-bearing fluid, the fluid-bearing fluid having a tendency to freely-flow from the at least one fluid-bearing platen zone out of the platen; and

a at least one membrane covering the one or more of the at least one aperture to prevent fluid of the at least one localized fluid pressure platen zone from exiting the structure two apertures that define each of the at least one localized fluid-pressure platen zones, the membrane being configured so that in response to fluid of the respective at least one localized fluid-pressure platen zone, the membrane is extendable into the fluid-bearing fluid of the at least one fluid-bearing platen zone.

Claim 2. (currently amended) A platen as recited in claim 1, wherein:

the at least one membrane is configured with a at least one first section secured to the structure around the one or more of the at least two apertures one aperture.

Claim 3. (currently amended) A platen as recited in claim 2, wherein:

the ~~at least one~~ membrane is configured with a second section surrounded by the ~~at least one~~ first section, and

the extendable configuration of the membrane comprises the second section having a ~~is~~ flexible characteristic for movement relative to the respective one or more of the ~~at least two apertures~~ ~~one aperture~~ in response to the fluid of the respective ~~at least one~~ localized fluid-pressure platen zone, the movement of the second section extends the second section into the flow of the fluid-bearing fluid.

Claim 4. (currently amended) A platen as recited in claim 3, wherein:

the movement of the second section relative to the respective one or more of the ~~at least two apertures~~ ~~at least one aperture~~ is movement away from the respective one or more of the ~~at least two apertures~~ ~~at least one aperture~~ in response to the fluid of the at least one localized fluid-pressure platen zone.

Claim 5. (currently amended) A platen as recited in claim 3, wherein:

the movement of the second section relative to the respective one or more of the ~~at least two apertures~~ ~~at least one aperture~~ is movement toward the respective one or more of the ~~at least two apertures~~ ~~at least one aperture~~ in response to the fluid of the at least one localized fluid-pressure platen zone.

Claim 6. (currently amended) A platen as recited in claim 1, wherein:

~~the at least one localized fluid-pressure platen zone is defined by a plurality of the apertures;~~

the one or more of the at least two apertures defining at least one localized fluid-pressure platen zone comprises at least two apertures each defining one of the localized fluid-pressure platen zones; and

the at least one membrane covers all of the one or more plurality of the two apertures defining one of the localized fluid-pressure platen zones; and

the platen comprises a second membrane covering one or more other of the at least two apertures, those other apertures define a second of the localized fluid-pressure platen zones, the second membrane is also configured to be extendable in response to fluid of the respective second localized fluid-pressure platen zone, the configuration of the second extendable membrane permits extension of the second membrane into the flow of the fluid-bearing fluid;

the two extendable membranes cooperate to reduce the tendency of the fluid-bearing fluid of the localized fluid-bearing platen zones to freely-flow out of the platen .

Claim 7. (currently amended) A platen as recited in claim 1, wherein:

~~the at least one localized fluid-pressure platen zone is defined by a plurality of the at least two apertures, one aperture the plurality of the at least two apertures are being organized in separate groups, each separate group corresponding to a different one of the localized fluid-pressure platen zones; and~~

~~the at least one membrane comprises a separate membrane covering each separate group of the plurality of the at least two apertures, each separate membrane is configured so that the separate membranes may are separately extendable into the flow of the fluid-bearing fluid in response to fluid-pressure fluid of a respective one of the localized fluid-pressure platen zones may collectively apply differential polishing pressures to the wafer .~~

Claim 8. (currently amended) A platen for use in a chemical mechanical planarization (CMP) system, comprising:

at least one fluid-bearing platen zone having a plurality of fluid-bearing outlets for supplying fluid-bearing fluid, the at least one fluid-bearing platen zone being disposed below and being capable of providing fluid-bearing pressure on a polishing pad; and

at least one fluid-pressure platen zone comprising at least one fluid-pressure port for transferring fluid-pressure fluid relative to the at least one fluid-bearing platen zone and the polishing pad, the at least one fluid-pressure platen zone being disposed below the polishing pad, each of the at least one fluid pressure platen zones zone further comprising ~~at least one a~~ member configured to define ~~a~~ at least one flexible pocket covering the at least one fluid-pressure port of the respective fluid-pressure platen zone to prevent the fluid-pressure fluid from freely-flowing relative to the

respective at least one fluid-bearing zone, the flexible pocket of each of the at least one fluid-pressure platen zones being configured to extend into the fluid-bearing fluid supplied from the fluid-bearing outlets .

Claim 9. (currently amended) A platen as recited in claim 8, wherein:

the fluid-pressure fluid transferred by the at least one fluid-pressure port flexes the respective membrane at least one flexible pocket to configure the at least one respective pocket flexible member; and

so that the polishing pad achieves a particular polishing profile during a CMP operation;

the configuration of each respective flexible pocket to extend into the fluid-bearing fluid restricts flow of the fluid-bearing fluid from the platen.

Claim 10. (currently amended) A platen as recited in claim 9, wherein a value of fluid-pressure of the fluid-pressure fluid transferred by the at least one fluid-pressure port is a static pressure value that is controlled relative to a value of a pressure of the fluid-bearing fluid.

Claim 11. (currently amended) A platen as recited in claim 8 9, wherein a value of fluid-pressure of the fluid-pressure fluid in each of the flexible pockets ~~ocket~~ is a static pressure having a value in a range of pressure from about 1 to 2 psi greater than a value of a pressure of the fluid-bearing fluid.

Claim 12. (currently amended) A platen as recited in claim 8 9, wherein:

the free-flow of the fluid-bearing fluid ~~is has~~ a tendency to freely-flow from the at least one fluid-bearing zone and out of the platen; and

the extension flexure of each ~~the~~ flexible pocket into the fluid-bearing fluid in response to the fluid pressure fluid transferred by the at least one fluid pressure port configures the flexible pocket so that the pocket restricts the tendency of the fluid-bearing fluid to freely-flow out of the platen.

Claim 13. (currently amended) A platen as recited in claim 8, wherein:

the fluid-bearing outlets of the at least one fluid-bearing zone are located at a position corresponding to a central area of a wafer to be polished so that the fluid-bearing fluid tends to freely-flow in a fluid-bearing gap away from the position to provide the fluid-bearing pressure to the polishing pad; and

the fluid-pressure fluid transferred relative to the at least one fluid-pressure port of the at least one fluid-pressure zone is capable of deforming each ~~deforms the flexible~~ member into the fluid-bearing gap to restrict the tendency of the fluid-bearing fluid to freely-flow in the fluid-bearing gap away from the position while the fluid-bearing fluid still provides the fluid-bearing pressure to the polishing pad.

Claim 14. (currently amended) A platen for use in a chemical mechanical planarization (CMP) system in which a polishing pad is configurable to apply selected polishing pressures to different areas of a wafer to be planarized, the platen comprising:

a fluid-bearing structure configured with a first plurality of apertures for transferring polishing pressure control fluid, the apertures being configured to define a plurality of localized fluid-pressure platen zones for applying selectable polishing pressure control pressures to the polishing pad; and

a membrane corresponding to each localized fluid-pressure platen zone, each membrane covering respective ones of the apertures corresponding to a respective one of the localized fluid-pressure platen zones, each membrane being sealed to the fluid-bearing structure to separate the polishing pressure control fluid of the respective localized fluid-pressure zone from the fluid-bearing structure, the sealing of each membrane enabling different selectable localized fluid pressures to be applied to each localized fluid-pressure platen zone to provide differential polishing pressure control pressures to the polishing pad;

the fluid-bearing structure being further configured with a second plurality of apertures for supplying fluid-bearing fluid between the respective membranes and the polishing pad.

Claim 15. (currently amended) A platen as recited in claim 14, wherein:

~~the fluid bearing structure is further configured with a second plurality of apertures for supplying fluid bearing fluid~~, the second plurality of apertures is being configured to define a second plurality of localized fluid-bearing zones for supplying fluid-bearing fluid to support the polishing pad, the fluid-bearing structure is being further configured with a gap between the respective membranes and the polishing pad, the gap is normally open to permit relatively free-flow of the fluid-bearing fluid to exit the fluid-bearing structure; and

each of the membranes is sealed to the fluid-bearing structure along the gap and responds to the polishing pressure control fluid from one or more of the apertures of the respective first plurality of apertures to restrict the gap and limit the flow between the respective membranes and the polishing pad of the fluid-bearing fluid from the fluid-bearing structure.

Claim 16. (original) A platen as recited in claim 15, wherein:

each sealed membrane responds to the polishing pressure control fluid by becoming inflated to define a pocket that extends at least partially across the gap to limit the flow of the fluid-bearing fluid from the fluid-bearing structure.

Claim 17. (currently amended) A platen as recited in claim 14, wherein:

the polishing pad is configured as an endless belt;  
the fluid-bearing fluid from the second plurality of apertures of the fluid-bearing structure provides a gap filled with the fluid-bearing fluid for supporting the endless belt spaced from the platen; and

each membrane is reconfigured by the polishing pressure control fluid received from the respective first plurality of apertures of the plurality of the respective localized fluid-pressure platen zone so that the reconfigured membrane enters the gap and restricts the flow of the fluid-bearing fluid through the gap.

Claim 18. (currently amended) A method of limiting consumption of fluid by in a platen of a chemical mechanical planarization system, comprising the operations of:

providing the platen with a at least one first aperture communicating with a self-contained for defining at least one localized fluid-pressure platen zone; and

~~sealing the at least one aperture with at least one flexible membrane secured around the at least one aperture to prevent fluid of the at least one localized fluid pressure platen zone from exiting the platen;~~

providing the platen with a second aperture for defining at least one fluid-bearing platen zone;

admitting fluid-bearing fluid into the second aperture, the fluid-bearing fluid tending to flow from the second aperture and out of the platen; and

admitting fluid-pressure fluid into the first aperture so that the self-contained localized fluid-pressure platen zone limits the flow of the fluid-bearing fluid out of the platen.

Claim 19. (currently amended) A method as recited in claim 18, wherein the platen defines a gap between a polishing pad and the platen, ~~wherein the method further comprising the operations of:~~

the admitting fluid-pressure fluid operation comprises the operations of:

transferring the fluid of the ~~at least one~~ localized fluid-pressure platen zone relative to the first ~~at least one~~ aperture to cause the localized fluid-pressure platen zone to apply a localized planarization pressure to the polishing pad ;

~~at least one membrane to flex~~; and

controlling the transferring operation to control the ~~a~~ localized planarization pressure applied via the polishing pad to a workpiece and to control the limited flow of the fluid-bearing fluid out of the platen .

Claim 20. (currently amended) A method as recited in claim 18, wherein the platen is a fluid-bearing platen and defines a fluid-bearing gap between a polishing pad and the fluid-bearing platen, the fluid-bearing gap extending outwardly from a central platen zone to the ~~at least one~~ self-contained localized fluid-pressure zone, the method further comprising the operations of:

configuring the fluid-bearing platen with ~~a plurality of apertures of the at least one aperture for defining the~~ at least one self-contained localized fluid-pressure zone outwardly of the central platen zone and having a flexible membrane;

~~transferring the fluid of the at least one localized fluid pressure zone relative to each of the plurality of apertures to cause the respective~~ at least one membrane sealing the respective aperture to flex; and

controlling the admitting fluid-pressure fluid transferring operation to cause the ~~respective membrane flexed membranes~~ to control a localized fluid-pressure applied to the polishing pad and a resulting localized planarization pressure applied via the polishing pad to a workpiece;

wherein the flexed membrane enters the gap to restrict the flow of the fluid-bearing fluid ~~of the fluid-bearing platen from exiting the fluid-bearing platen through the fluid-bearing gap and out of the platen.~~